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ABSTRACT

Four bibliographies from Dean's Grant Projects (programs designed to prepare regular class teachers to work with mainstreamed handicapped students) are provided. Entries include author's name, title, source, date and pagination information, and, in two of the bibliographies, a brief annotation. The following topics are the central concerns of the bibliographies: teacher attitudes towards children with special needs, math and the handicapped, and science education and the handicapped. The final bibliography, also on science instruction for the handicapped, was prepared by Science for the Handicapped Association, an interest group of the National Science Teachers Association. (CL)

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REPORTS OF THE DEANS' GRANTS

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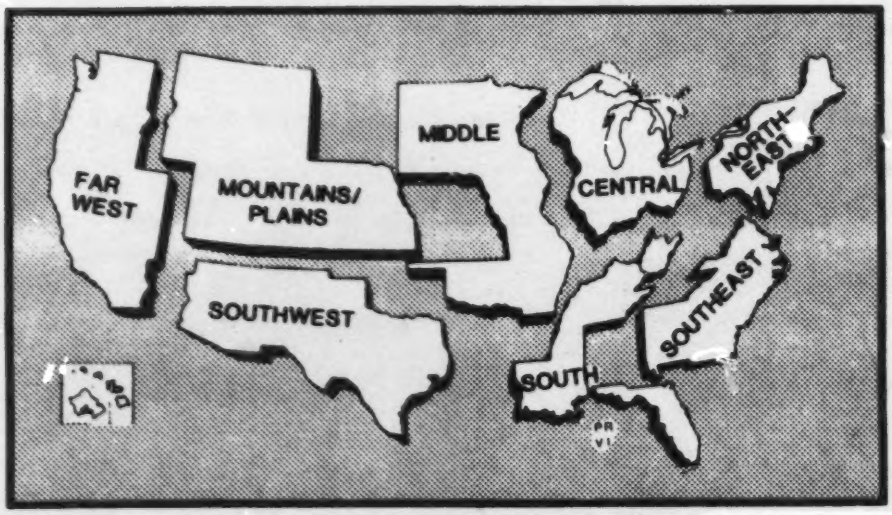

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REPORTS OF THE DEAN'S GRANT PROJECTS SERIES

1 DEAN'S GRANT PRODUCTS (INTERIM REPORT #1) 1981

2 SECONDARY EDUCATION OF THE HANDICAPPED: CONFERENCE PROCEEDINGS 1980. Colorado State University. Marilyn F. Fender, Editor.

3 TOWARD A RESEARCH BASE FOR THE LEAST RESTRICTIVE ENVIRONMENT: A COLLECTION OF PAPERS. University of Kentucky, Dean's Grant Project. January 1981.

4 SELECTED BIBLIOGRAPHIES: DEAN'S GRANT PROJECTS 1981

Minneapolis, Minnesota

1981

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Included in this collection of bibliographies are the following:

Teacher Attitudes Toward Children with Special Needs -- A Selected Bibliography
Developed through the DGP, Virginia Commonwealth University

Math and the Handicapped: An Annotated Bibliography of Selected Literature
Developed through the DGP, Virginia Commonwealth University

Science Education and the Handicapped: An Annotated Bibliography of Selected Literature
Developed through the DGP, Virginia Commonwealth University

Science for the Handciapped Association Bibliography
Developed by SHA, an interest group of the National Science Teachers Association

Note: *These are but a rough start at a collection of bibliographies on topics of interest across the Dean's Grant Pre-Service Training Projects. Criteria for inclusion are related to relative scarcity of representative bibliographies on selected topics. Dean's Projects (and others) will have developed bibliographies which will contribute to this collection. Projects are welcome to forward short, selected bibliographies to the NSSP for possible inclusion in an expanding collection.*

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Questions may be directed to the National Support Systems Project, University of Minnesota, 350 Elliott Hall, Minneapolis, Minnesota 55455.

Teacher Attitudes

Toward

Children with Special Needs

-A Selected Bibliography-

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Howard Ozmon

Brenda Kauffman

Judy Starr

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Richmond, Va.
July 1980

These training materials were developed pursuant to Grant OEG G007801524 from BEH/USOE/HEW. Opinions expressed are those of the authors. No official endorsement by the U.S. Office of Education or Virginia Commonwealth University should be inferred.

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Alexander, C., & Strain, P. S. A review of educators' attitudes toward handicapped children and the concept of mainstreaming. Psychology in the Schools, July 1978, 15 (3), 390-396.

Brownsmith, K. Evaluation of the affective education training program. Final report 18.3. Indiana University, Bloomington, Center for Innovation in Teaching the Handicapped, 1976. (ERIC Document Reproduction Service No. ED 133 984)

Buttery, T. J. Affective response to exceptional children by students preparing to be teachers. Perceptual and Motor Skills, February 1978, 46 (1), 228-290.

Byrnes, M. A. Positive attitudes: A must for special programs in public schools. Teaching Exceptional Children, Winter 1976 8 (2), 82-84.

Chalfant, J. C., & Foster, G. E. Helping teachers understand the needs of learning disabled children. Journal of Learning Disabilities, February 1977, 10 (2), 79-85.

Christensen, G. The circle of human needs. Instructor, March 1976, 85 (7), 103-106.

Clark, E. A. Teacher attitudes toward integration of children with handicaps. Education and Training of the Mentally Retarded, December 1976, 11 (4), 333-335.

Cleary, M. E. Please know me as I am: A guide to helping children understand the child with special needs. Sudbury, Mass.: Sudbury Public Schools, 1975. (ERIC Document Reproduction Service No. ED 112 630)

Cohen, S., & Koehler, N. Fostering positive attitudes toward the handicapped: A selected bibliography of multimedia materials. City University of New York: Graduate School and University Center, 1975.

Cohen, S., & Koehler, N. A selected bibliography on attitudes toward the handicapped. City University of New York: Graduate School and University Center, 1975. (ERIC Document Reproduction Service No. ED 140 517)

Copeland, A. P., & Weissbrod, C. S. Differences in attitudes toward sex-typed behavior of nonretarded and retarded children. American Journal of Mental Deficiency, November 1976, 81 (3), 280-288.

Feitler, F. C. & DuBasik, V. Attitudes of regular classroom teachers toward EMR students. Convention of American Educational Research Association: Toronto, Canada, 1978. (ERIC Document Reproduction Service No. ED 155 857)

Fix, C., & Rohrbacher, J. Attitudes: The neglected barrier facing the handicapped. Florida Vocational Journal, September 1978, 4 (1), 14-19.

Fostering positive attitudes toward the handicapped in school settings. Albany, N. Y.: New York State Education Department, 1975. (ERIC Document Reproduction Service No. ED 115 068)

Virginia Commonwealth University

George, W. C. Discussion of barriers to education of the gifted: attitudes and behaviors. Talents and Gifts, May 1977, 19 (4), 2-4.

Gickling, E. E., & Theobald, J. T. Mainstreaming: Affect or Effect. Journal of Special Education, Fall 1975, 9 (3), 317-328.

Glazzard, P. Simulation of handicaps as a teaching strategy for preservice and inservice training. Teaching Exceptional Children, Spring 1979, 101-104.

Harasymiw, S. J., & Others. Teacher and pupil disability attitude congruency. Chilcago, Ill.: Annual International Convention, The Council for Exceptional Children, 1976. ERIC Document Reproduction Service No. ED 125 209)

Harasymiw, S. J., & Horne, M.D. Teacher attitudes toward handicapped children and regular class integration. Journal of Special Education, Winter 1976, 10 (4), 393-400.

Mandell, C. J., & Strain, P. S. An analysis of factors related to the attitudes of regular classroom teachers toward mainstreaming mildly handicapped children. Contemporary Educational Psychology, April 1978, 3 (2), 154-162.

Moore, J., & Fine, M. J. Regular and special class teachers' perceptions of normal and exceptional children and their attitudes toward mainstreaming. Psychology in the Schools, April 1978, 15 (2) 253-259.

Newman, J. Faculty attitudes toward handicapped students. Rehabilitation Literature, July 1976, 37 (7), 194-197.

Redden, M. R., & Blackhurst, A. E. Mainstreaming competency specifications for elementary teachers. Exceptional Children, May 1978, 615-517.

Sigler, G. R., & Lazar, A. L. Prediction of teachers' attitudes toward handicapped individuals. Long Beach, Calif.: California State Univ., 1976.

Singleton, K. The role of the resource specialist in increasing positive attitudes toward having individuals with special needs enrolled in the regular classroom. Final report. Sacramento, Calif.: California State Department of Education, 1976. (ERIC Document Reproduction Service No. ED 148 040)

Weber, M. B., & Others. Attitudes of public school teachers towards mainstreaming the mentally retarded. Atlanta, Ga.: Council for Exceptional Children, Fall Meeting, 1977. (ERIC Document Reproduction Service No. ED 150 817)

Ysseldyke, J. E. & Foster, G. G. Bias in teachers' observation of emotionally disturbed and hearing disabled children. Exceptional Children, May 1978, 44 (8), 613-615.

Math and the Handicapped:

An Annotated Bibliography

of

Selected Literature

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These training materials were developed pursuant to Grant OEG G007801524 from BEH/USOE/HEW. Opinions expressed are those of the authors. No official endorsement by the U.S. Office of Education or Virginia Commonwealth University should be inferred.

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MATH AND THE HANDICAPPED:

AN ANNOTATED BIBLIOGRAPHY OF SELECTED LITERATURE

I. Diagnostic-Prescriptive Approach

Beattie, John R. and Stuart Schwartz. "Readability of Special Education Math Books", Pointer, Vol. 23, No. 2 (Winter, 1979), pp. 43-46.

Discusses the relationship between math skills and reading ability as it relates to the learning disabled, emotionally disturbed, or mentally handicapped student. The author explains that many math books require reading at a level beyond the ability of many special needs students.

Callahan, Leroy. "Remedial Work with Underachieving Children." The Arithmetic Teacher, Vol. 9 (March 1962) pp. 138-40.

Describes a three month individual diagnostic and remedial program which significantly reduced the underachievement of participants.

Cohen, Mel. "Fiasco", Mathematics Teaching, No. 83 (June 1978), pp. 21-25.

Argues for more awareness and exploration of individual student differences and handicaps.

Fowler, Mary Anne. "Why Did He Miss That Problem?", Academic Therapy, Vol. 14, No. 1 (September 1978), pp. 23-33.

Reviews literature on the diagnostic teaching approach, with particular emphasis on mathematics in the elementary school.

Glennon, Vincent J. and John Wilson. "Diagnostic-Prescriptive Teaching." The Slow Learner in Mathematics. 35th Yearbook of the National Council of Teachers of Mathematics, Washington, D.C.: NCTM, 1972, pp. 282-318.

Within the context of a larger view of curriculum and methods variables, the authors present a model for cognitive diagnosis and prescription. A content taxonomy is related to behavioral indicators and kinds of psychological learning products. Procedures for diagnostic--prescriptive teaching are discussed and illustrated; sample lesson plans are included.

Goodstein, H.A. "Assessment and Programming in Mathematics for the Handicapped", Focus on Exceptional Children, Vol. 7, No. 7 (December 1975), pp. 1-11.

Issues in mathematics assessment and programming for the handicapped are reviewed and Project MATH, a criterion--referenced curriculum designed for handicapped learners, is described. Project MATH provides activities in six major areas: sets patterns, geometry, numbers, fractions, and measurement. Analized are the following project components: the interactive unit (a system which specifies combinations of instructional interaction), needs assessment, concept inventory (used for screening and progress assessment), instructional evaluation items, and verbal problem-solving tasks. The role of the teacher in instructional management is emphasized.

Hofman, Doris. "The Child With a Learning Disability in Arithmetic," The Arithmetic Teacher, Vol. 18 (March 1970), pp. 199-203.

Deals with the diagnostic-remedial process, particularly where children appear unable to learn arithmetic. Perceptual skills, motor disinhibition, perseverance, language, and reasoning are discussed; and a few remedial techniques are discussed.

II.. Task-Analysis

Callahan, Leroy G. and Mary L. Robinson. "Task-Analysis Procedures in Mathematics Instruction of Achievers and Underachievers," School Science and Mathematics, Vol. 73 (October 1973), pp. 578-84.

The authors report research suggesting that when the task-analysis procedures of Gagne are combined with meaningful mastery learning of subordinate tasks in a hierarchy learning of a mathematical task can be quite effective.

Gagne, Robert M. "Learning and Proficiency in Mathematics." The Mathematics Teacher, Vol. 56 (December 1963), pp. 620-26.

Describes a method of analyzing desired pupil behaviors into subordinate behaviors.

III. Activities Designed to Help Teach Math Concepts to Specific Types of Handicapped Students

Batarseh, Gabriel. "Addition for the Slow Learner," Arithmetic Teacher, Vol 21, No. 8 (December 1974), pp. 714-715.

An alternative algorithm for addition of whole numbers is presented.

Berrill, Renee. "Mathematics and Slow Learners." Mathematics in School, Vol. 5, No. 1 (January 1976), pp. 26-28.

An experiment is described in which slow learners were successfully taught mathematical concepts by audiotape.

Blankenship, Colleen S. "Remediating Systematic Inversion Errors in Subtraction through the Use of Demonstration and Feedback," Learning Disability Quarterly, Vol 1, No. 3 (Summer 1978), pp. 12-22.

A demonstration-plus-feedback technique was applied in an attempt to reduce the systematic inversion errors in subtraction in nine LD students (ages 9-11years)

Braunfield, Peter and Martin Wolfe. "Fractions for Low Achievers." The Arithmetic Teacher, Vol. 13 (December 1966), pp. 647-55.

Describes a novel approach to fractions involving hooking up stretching and shrinking machines.

Cawley, John F. and others. "LD Youth and Mathematics: A Review of Characteristics," Learning Disability Quarterly, Vol. 2, No. 1 (Winter 1979), pp. 29-44.

The article discusses different types of failure in mathematics and relates them to the problem of learning disability and presents and examines specific data on the attainments and characteristics of LD children.

Cawley, John F. and others. "Mathematics and Learning Disabled Youth: The Upper Grade Levels," Learning Disability Quarterly, Vol. 1, No. 4 (Fall 1978), pp. 37-52.

Presents a revised model for individualized mathematics programming for the LD adolescent.

Goodstein, Henry A. "Solving the Verbal Mathematics Problem", Teaching Exceptional Children, Vol 6, No. 4 (Summer 1974), pp. 178-82.

Discussed is use of pictorial aids to develop word problem skills for addition and subtraction of handicapped children.

Hammitt, Helen. "Evaluating and Reteaching Slow Learners". The Arithmetic Teacher, Vol. 14 (January 1967) pp. 40-41.

Proposes a plan for children to regularly evaluate their own skills in computation.

Jones, Phillip S. "Notes on Numeration: Arithmetic on a Checkerboard Numerals for the Blind," School Science and Mathematics, Vol. 78, No. 6 (October 1978), pp. 481-488.

An historical treatment of computational devices that use counters on a checkerboard. Discussion includes works of John Napier, Walter Minto, and Nicholas Saunderson.

Kang, Young Woo and Bashie Masoodi. "Abacus Instruction for Moderately Retarded Blind Children", Education of the Visually Handicapped, Vol. 10, No. 3 (Fall 1978-1979), pp. 79-84.

Describes the process of teaching abacus to moderately retarded blind students as a means of developing concepts of numbers, addition and subtraction, and money values.

Kevra, Barbara and others. "Success for Slower Learners or Rx: Relax... and Play". The Arithmetic Teacher, Vol. 19 (May 1972), pp. 335-43.

Presents a variety of ideas for practicing the basic facts of arithmetic.

Kurtz, Ray and Joan Spiker. "Slow or Learning Disabled...Is There a Difference?" Arithmetic Teacher, Vol. 23, No. 8 (December 1976), pp. 617-622.

Characteristics of the slow learner and the learning disabled child are identified. Educational procedures to help the learning disabled child in mathematics are discussed.

Myers, Ann C. and Carol A. Thornton. "The Learning Disabled Child... Learning The Basic Facts", Arithmetic Teacher, Vol. 25, No. 3 (December 1977), pp. 46-50.

Learning activities are described involving teaching different techniques that can help a child learn the basic facts.

Nadash, Andre. "Metric for the Blind", American Metric Journal, Vol. 5, No. 1 (1977), pp. 21-22.

The Braille representation for the alphabet, for special symbols, (such as the percent sign, the period, the number sign), for digits, and for metric symbols are presented.

Pettican, J. "Mathematical Games and Puzzles for the Handicapped", Mathematics in School, Vol. 7, No. 3 (May 1978), np. 4-5.

Five mathematical puzzles of the type requiring numbers or pieces to be placed in certain positions to provide a specific result are described. The puzzles are presented in the form of dice, oent-ominoes, boards, and numbered pegs.

Sweet, Shiela C. "Math and LD: A New Perspective", Academic Therapy, Vol. 14, No. 1 (September 1978), pp. 5-13.

Describes a math-oriented approach to remediating learning disabilities in children.

Taylor, George and Susan Watkins. "Active Games: An Approach to Teaching Mathematical Skills to the Educable Mentally Retarded," The Arithmetic Teacher, Vol. 21, No. 8 (December 1974) pp. 674-678.

Several games involving both motor behavior and practice with mathematical skills are described. These include adaptations of musical chairs (subtraction), call ball (multiplication)and ring toss (linear movement);other games are designed to provide practice on identifying numerals, telling time, using money, and naming fractions.

Thornton, Carol A. "Rx=Geometry: Perceptual Motor Help for Many Handi-capped Learners". Arithmetic Teacher, Vol. 27, No. 2 (October 1979), pp. 24-26.

A discussion of the advantages of using geometry with handicapped learners is given.

Thornton, Carol and Rosemary Reiulle. "The Classroom Teacher, The LD Child, and Math", Academic Therapy, Vol. 14, No. 1 (September 1978), pp. 15-21.

Intended for the classroom teacher, the article offers suggestions for dealing with the child who has a learning disability in mathematics.

Vitello, John and Patricia Bruce. "Computer-Assisted Instructional Programs to Facilitate Mathematical Learning Among the Handicapped", Journal of Computer Based Instruction, Vol. 4, No. 2 (November 1977), pp. 26-29.

Two mathematics programs developed for presentation via computer-assisted instruction are discussed: ADD, a computer based program for the mentally handicapped child who requires frequent successes in initial learning, and SHAPE, a program demonstrating the development of quantitative concepts.

Weill, Bernice T. "Mrs. Weill's Hill: A Successful Subtraction Method for Use with the Learning Disabled Child", Arithmetic Teacher, Vol. 26, No. 2 (October 1978), pp. 34-35.

A concrete approach to subtraction problems with minuends to 19 is presented.

Science Education and the Handicapped: An Annotated Bibliography of Selected Literature

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SCIENCE EDUCATION AND THE HANDICAPPED:
AN ANNOTATED BIBLIOGRAPHY OF SELECTED LITERATURE

I. MAIN SOURCES OF INFORMATION

Hofman, Helenmarie and Kenneth S. Ricker ed. Science Education and the Physically Handicapped. Washington: National Science Teachers Association, 1979. 284 pages.

Articles and papers in this book have been divided into 10 sections:
1) Science Edu & the Handicapped
2) Science for Everyone
3) Preparing teachers to work with the handicapped
4) Resources for Teacher/Schools
5) Science & the Auditorially Handicapped
6) Science & the Orthopedically Handicapped
7) Science & the Visually Handicapped
8) Extending the Science Program Beyond the School
9) The Handicapped and Careers in Science and Related Fields
10) Science Education and the Handicapped - Implications for the Future

Rowe, Mary Budd. Teaching Science as Continuous Inquiry. Second Edition. New York: McGraw-Hill Book Co., 1978. (Ch. 13, "Doing Science with Handicapped Student")

Chapter covers the following objectives:
1) Adapt some science activities for use by blind students and deaf students
2) Analyze the content of a scientific experiment to determine what variables are important as regards adaptation
3) Decide what evidence would normally be associated with the variables defined in item 2
4) Identify the possible modalities that could be used in collecting evidence
5) Adapt the apparatus as necessary
6) Devise a technique for having handicapped students record data

Science and Children, March, 1976 issue devoted to the subject. Several articles from this issue are included in the following list.

II. GENERAL INFORMATION

Bennett, Lloyd M. "Science and Special Students," Science and Children, Vol. 15, No. 4 (Jan., 1978), pp. 12-14.

This study was designed to determine if special elementary students could learn basic science concepts. Students included the physically handicapped, emotionally disturbed, educable mentally retarded, and trainables. Modules with pretest and posttest were used. Results indicated that regardless of handicap, students were able to work successfully and adequately in science.

Davis, Cheryl A. "Science Education for Handicapped-Theme of Conference," Science, Vol. 201, No. 4354 (Aug., 1978), p. 434.

Describes a conference that included among its participants handicapped students and scientists. Purpose: to explore barriers to science education faced by handicapped students and how to overcome those barriers.

Hadary, Doris E. and others. "Out of Darkness and Silence," Science and Children, Vol. 16, No. 6 (March, 1979), pp. 40-41.

Describes observational measures being developed to diagnose handicapped children with high ability. Discusses the program for deaf, blind and LD students at the American University.

Hoffman, Edward and others, "Exceptional Children in Intermediate and Secondary Science Programs: A Teacher Survey," Science Education, Vol. 62, No. 1 (Jan.-Mar., 1978), pp. 11-17.

Reports results of a survey of teachers' direct contact and experience with exceptional students in their classes. Results indicate the majority of teachers have had some experience.

McIntyre, Margaret. "Science is for All Children," Science and Children, Vol. 13, No. 6 (March, 1976), pp. 60-61.

Some ways in which exploratory activities of the preschool child involve science concepts are described. The role of adults knowledgeable about both science and child development is stressed. Emphasis is placed on hands-on experiences.

Molloy, Larry. "Law and the Handicapped," Science and Children, Vol. 13, No. 6 (March, 1976), pp. 7-10.

Defines and discusses the handicapped child and what mainstreaming will mean to both the child and the teacher.

Monaco, Theresa. "Mainstreaming, Who?" Science and Children, Vol. 13, No. 6 (March, 1976), p. 11.

Presented are facts related to what putting handicapped children with normal children will do. The article favors teaching handicapped and normal children together.

Redden, Marth and Shirley Malcom. "A Move Toward the Mainstream," Science and Children, Vol. 13, No. 6 (March, 1976), p. 14.

Urges teachers of science to handicapped children in the mainstream school to accept the challenge of involving the handicapped child as a contributing member of their regular classes. To do this, the teacher must have access to a variety of materials.

Ricker, Kenneth S. "Science and the Physically Handicapped," Viewpoints in Teaching and Learning, Vol. 55, No. 1 (Winter, 1979), pp. 67-76.

The integration of physically (sensory and orthopedic) handicapped students into science classes creates a complex problem for science educators. Suggestions are offered for teacher preparation and for the development of specialized materials and modification for instructional strategies.

Rowe, Mary Budd. "Help is Denied to those in Need," Science and Children, Vol. 12, No. (March, 1975) 23-25.

Activity-based and inquiry-centered science programs can help handicapped students and students from low socio-economic backgrounds in the areas of verbal fluency, language complexity, logic, and attitudes. ESS, SCIS, and SAPA materials are all addressed.

Walsh, Efthalia. "The Handicapped and Science: Moving Into the Mainstream," Science, Vol. 196, No. 4297 (June, 1977), pp. 1424-1426.

The possible impact of the White House Conference on Handicapped Individuals and the insurance of the regulations implementing the Rehabilitation Act of 1973 on the handicapped movement in education are detailed.

III. SPECIFIC HANDICAPPING CONDITIONS

A. Mental Handicaps

Bennett, Lloyd M. and Kay Downing "Science Education for the Mentally Retarded," Science Education, Vol. 55, No. 2 (Apr.-June, 1971) pp. 155-161.

Reviews the research and general literature on science education for educable mentally retarded, and recommends using the Santa Cruz curriculum guide and preparation of study units based upon scope and sequence charts for the retarded.

Danglade, Ruth and Daniel M. Ball. "Science for Someone Special," Science and Children, Vol. 16, No. 3 (Nov.-Dec., 1978), pp. 23-24.

Special education teachers were introduced to ESS units and used these materials in their classes.

Davies, Janet and Daniel M. Ball. "Utilization of the Elementary Science Study with Educable Mentally Retarded Students," Journal of Research in Science Teaching, Vol. 15, No. 4 (July, 1978), pp. 281-286.

Study of 207 students investigating the effects of ESS on selected science skills including communication, observation, and inference.

Grant, William D. "He Now and He and My Environment: Science for the Exceptional Student," Science Education, Vol. 59, No. 2 (Apr.-June, 1975) pp. 249-254.

Describes the units of a science program for educable mentally handicapped students developed by the Biological Sciences Curriculum Study Project and the role of the teacher during implementation of the program.

Holzberg, Robert. "The Educable Retarded." Science and Children, Vol. 13, No. 6 (March, 1976) p. 19.

Generalizations about the educable retarded are presented. The need is for small group instruction and more time for a child to internalize science processes and information. Suggestions are given to help overcome attention span difficulties, problems of recall and difficulties with transfer.

Lombardi, Thomas P. and Patrick E. Balch. "Science Experiences and the Mentally Retarded," Science and Children, Vol. 13, No. 6 (March, 1976) p. 20.

Guidelines which any educator should observe as he incorporates science into the curriculum for the mentally retarded are offered. Active participation with materials is essential. Teaching should proceed from the known to the unknown.

Menhusen, Bernadette R., and Roy O. Gromme. "Science for Handicapped Children--Why?", Science and Children, Vol. 13, No. 6 (March, 1976) pp. 35-37.

Presented are reasons why EMH children have usually been deprived of science in their curriculum as well as discussion of a study done to counteract these problems. Curriculum programs specifically developed for these children are described.

Ricker, Kenneth S., Ed. "Curriculum Reviews (Me Now)" Science and Children. Vol. 13, No. 6 (March, 1976). pp. 37-38.

Reviews prepared by NSTA Curriculum Review Center at the University of Georgia, Athens, are presented. The Me Now Program is described in detail-showing organization into four units representing a two-year instructional program for an Educable Mentally Handicapped Class.

B. Emotional Handicaps

Lamendola, Angelo. "Science and the Emotionally Disadvantaged Child-A Case Study," Science and Children, Vol. 13, No. 6 (March, 1976), pp. 17-18.

Describes the use of individualized science lessons for primary grade children at a residential school. Lessons were designed in activity style for 1 or 2 children working together, apart from the main class. Verbal encouragement, praise, and tangible reinforcement.

Ovnik, Mary Ann. "Contract Teaching" Science and Children, Vol. 13, No. 6 (March, 1976), pp. 44-45.

Individualization of instruction for the learning-disabled and/or behavior-disordered student is considered a must. Contract teaching, a programmed type learning plan, is described in five basic steps. Numerous effective learning experiences are possible.

Slavin, Lawrence E. "A Viable Approach for LD/EH Students in a Biology Course," American Biology Teacher, Vol. 41, No. 3 (March, 1979), pp. 164-170, 189. *

Presents a biology course developed for LD & EH students at Alhamra High School, Phoenix, Arizona.

*Secondary education

C. PHYSICAL HANDICAPS

1. Auditorially Impaired

Borron, Roberta. "Modifying Science Instruction to Meet the Needs of the Hearing Impaired," Journal of Research in Science Teaching, Vol. 15, No. 4 (July, 1978), pp. 257-262.

Examines how the performance of 8 1st grade deaf students was modified by S-APA. Conclusion-student learning not dependent on language ability.

Boyd, Eunice and Kenneth D. George. "The Effect of Science Inquiry of the Abstract Categorization Behavior of Deaf Children," Journal of Research in Science Teacing, Vol. 10 (1973), pp. 91-99.

The study was designed to determine if experiences in manipulating physical objects could increase classification abilities of deaf students ages 10-13. Goldstein-Sheerer Object Sorting Test forms were used in a pre-and posttest design. Analysis of data revealed increased scores of deaf children in experimental group.

Bybee, R. W. "A Review of Literature of Science for the Deaf," Science Education, Vol. 56 (1972), pp. 237-242.

A review of selected books, articles, papers and reports dealing with science for the elementary, secondary, and college levels.

Bybee, Rodger W. "Science in a Silent World," Science Activities, Vol. 6, No. 5 (Jan., 1972), pp. 25-27, 54.

SCIS materials are modified for use with acoustically handicapped pupils.

Bybee, R. W. and P. A. Hendricks. "Teaching Science Concepts to Preschool Deaf Children to Aid Language Development," Science Education, Vol. 56 (1972), pp. 303-310.

Describes a program in which SCIS materials were successfully modified for a class of young auditorially impaired students. Vocabulary development and a positive attitude were noted in the children.

Collea, Francis P. "Science in Sounds," Science and Children, Vol. 13, No. 6 (March, 1976) p. 34

An active, materials-centered approach to learning, using the Science Curriculum Improvement Study (SCIS) is described in its use at a school for the hearing impaired.

Egelston, J. C., and D. Mercaldo. "Science Education for the Handicapped: Implementation for the Hearing Impaired," Science Education, Vol. 59, No. 2 (Apr.-June, 1975), pp. 257-261.

Describes the specialized techniques required for teaching science to deaf students. Emphasis is on the use of the program Me Now developed by the BSCS group as a science course for use with young deaf children or verbally less able children.

Grant, William D. and Others. "A Project to Determine the Feasibility of BSCS's Me Now for Hearing-Impaired Students," American Annals of the Deaf, Vol. 120 (Feb., 1975), pp. 63-69.

An innovative science program recently developed for use with educable mentally handicapped students was tested on 6 low-verbal, hearing impaired secondary students of normal intelligence.

Hadary, Doris and others. "Breaking Sound Barriers for the Deaf Child," Science and Children, Vol. 14 (Nov.-Dec., 1976), p. 33.

A comprehensive, sequential labroatory science and art curriculum for deaf elementary school children at The American University is described. The curriculum is based on discovery experiences from adapted ESS, SCIS and S-APA lessons with parallel art lessons.

Lenth, J. William. "A Purpose for Science in a Curriculum for the Deaf." American Annals of the Deaf, Vol. 110, No. 2 (March, 1965), pp. 376-378.

States the importance of teaching deaf children science process skills (as opposed to facts and concepts), so that they can better cope with the changing world after graduation.

Linn, Marcia C. "Science Education for the Deaf: Comparison of Ideal Resource and Mainstream Settings," Journal of Research in Science Teaching, Vol. 16, No. 4 (July, 1979), pp. 305-16.

Investigates the cognitive and social aspects of a mainstreamed setting for deaf children. Twelve mainstreamed children placed with non-handicapped children in an elementary school were compared with nine resource deaf children. Reactions were assessed. Results showed no difference between resource students and mainstremed students.

Owsley, P. J. "Teaching Science to Deaf Children," American Annals of the Deaf, Vol. 107, No. 3 (May, 1962), pp. 339-42.

Stresses the need for including the problem-solving approach with young deaf students to develop a scientific attitude. Includes 8 considerations when presenting experiments and demonstrations for more interesting and informative lessons.

7. Visually Impaired

de Haaff, Susan Jean. "A Creative Science Project for Blind Children," Journal of Visual Impairment and Blindness, Vol. 71 (Dec., 1977), pp. 458-459.

A teacher of visually handicapped students at the upper elementary level describes a lesson plan from a creative science program which involves students in a model experiment about plant growth. The lesson is explained to be based on a conventional 5th grade science text and adapted for the needs of visually impaired students.

Eichenberger, Rudolph J. "Teaching Science to the Blind Student," The Science Teacher, Vol. 41, (Dec., 1974), pp. 53-54.

Describes how to adapt physical science laboratories which depend on visual data input for blind students. Gives instruction for graph construction, use of the tape recorder, solving mathematical problems with a Braille abacus and other suggestions for physical science laboratories.

Franks, Frank. "Educational Materials Development in Primary Science: An Introductory Science Laboratory for Young Blind Students." Education of Visually Handicapped, Vol. 7 (Dec., 1975), pp. 97-101.

Presents an operational construct for the systematic identification, classification, development, evaluation and production of educational aids for visually handicapped students.

Franks, Frank L. "Using the Light Sensor to Introduce Laboratory Science," Science and Children, Vol. 13, No. 6 (March, 1976), pp. 48-49.

An instrucment which affords blind students opportunities for direct observation, experimentation, and discovery is described. Accompanying the light sensor is a manual containing 25 experiments.

Gough, Elva R. "Common Sense and Sensitivity in Teaching the Blind," The Science Teacher, Vol., 45, No. 9 (December, 1978), pp. 34-35.

Discusses how a science teacher should help visually impaired students and how he can cope with their problems. Also discusses what a science teacher can provide for a visually impaired student's safety and how this student should be helped to do lab activities.

Hadary, Doris E. "Picking up Good Vibrations from Science for the Handicapped," The Science Teacher, Vol. 42. (Dec., 1975), pp. 12-13.

Describes the following programs for blind and handicapped students: a four-year science curriculum for elementary students and an Enrichment Science Laboratory for secondary students.

Hadary, Doris E; and others "Interaction and Creation Through Laboratory Science and Art for Special Children" Science and Children, Vol. 13, No. 6 (March, 1976) pp. 31-33.

Experiments with adapted apparatus which allow blind children to discover principles are described. Individualized experiences, specifically designed, are developed in four curricula and a sample lesson is presented.

Kaschner, Susan K. "Viewing the Earth with Closed Eyes," Science Activities, Vol. 15, No. 3 (1978), pp. 12-13.

Describes earth science activities for the visually impaired student. Includes soil type identification stream table erosion, and relief map activities. Recommends a multi-sensory approach to the teaching of earth science and hands-on activities.

Linn, M. C. and H. D. Thier. "Adapting Science Material for the Blind (ASMB): Expectation for Student Outcomes," Science Education, Vol. 59, No. 2 (Apr.-June, 1975), pp. 237-246.

Reports an investigation concerning whether additional concrete experiences with objects will foster the logical development of blind children. The success of the ASMB units for various goals and various learner groups are discussed and tentative conclusions drawn. Significant gains were made.

Linn, Marcia C. and Rita M. Peterson. "The Effect of Direct Experience with Objects on Middle Class, Culturally Diverse, and Visually Impaired Young Children," Journal of Research in Science Teaching. Vol. 10, No. 1 (1973), pp. 83-90.

This study was conducted to analyze the classification ability of middle class, culturally diverse, and visually impaired children after instruction in a SCIS unit. The SCIS unit was affective in improving student abilities to classify.

Malone, Larry and Linda deLucehi. "Life Science for Visually Impaired Students." Science and Children. Vol. 16, No. 5 (Feb., 1979), pp. 29-31.

Describes life science activities for blind or visually impaired students including aquarium studies, plant germination, classroom animals, and outdoor activities designed with a multi-sensory approach.

Schatz, Dennis, and others "Hands-on Science for the Blind" Science and Children, Vol. 13, No. 6 (March, 1976) pp. 21-22.

Stresses the fact that science activities can be styled to the visually handicapped students' levels and degrees of independence. Use of extensive hands-on, concrete experiences as emphasized by Adapting Science Materials for the Blind (ASMB) is encouraged.

Thier, Herbert D. "Laboratory Science for Visually Handicapped Elementary School Children," The New Outlook for the Blind, Vol. 65, No. 6 (June, 1971), pp. 190-194.

Describes how SCIS programs can be adapted for visually impaired children, taking a laboratory approach- stressing observation, manipulation of materials, and development of language skills to describe and explain events. It includes 1 example each from the physical and biological sciences, illustrating the specific adaptation of the activities.

Thier, Herbert D. and Doris Kadary. "We Can Do It, Too," Science and Children, Vol. 11, No. 4 (Dec., 1973) pp. 7-9.

Describes some of the adaptations of science exercises found in the program Adapting Science Materials for the Blind. This program enables blind and other visually impaired pupils to participate in the activities of SCIS.

Thier, Maurice. "Utilizing Science Experiences for Developing Visual Perception Skills." Science and Children, Vol. 13, No. 6 (March, 1976), pp. 39-40.

Described are alternative approaches for developing visual perception skills found in using selected science experiences. Use of various science programs available, such as ESS, SCIS, OBIS, and Natal is suggested. Visual sequencing is prescribed and described.

Utz, W. R. "The Blind Student in the Mathematics Classroom," American Mathematical Monthly, Vol. 86, No. 6 (June-July, 1979), pp. 491-494.

A college mathematics teacher shares experiences in the teaching of blind students. Suggestions are given on topics such as classroom procedures and testing.

3. Orthodedically Impaired

Wolinsky, Gloria. "Science Education and the Severely Handicapped Child," Science Education, Vol. 49, No. 4 (Oct., 1965), pp. 327-335.

Discusses the need to include relevant experiences designed around some of the biological and physical sciences to help physically handicapped children learn about their conditions and adjust to their lifestyles. Diagrams and descriptions of some examples of adapted equipment are included.

IV. INCORPORATION OF OTHER ACADEMIC AREAS

Post, Thomas, R., "Laboratory-Based Mathematics and Science for the Handicapped Child," Science and Childre , Vol. 13, No. 6 (March, 1976), pp. 41-43.

The laboratory approach to science and mathematics is described as a refreshing change for both teacher and students. Suggestions are given for planning a laboratory-based program. Guidelines for teachers of both handicapped and non-handicapped are included. A school for handicapped children in Minneapolis is described.

Powers, Linda. "Science and Art in Mainstream Education: Toward the Normalization of the Handicapped Child," Amicus, Vol. 2, (June, 1977) pp. 37-41.

Reviewed are recent developments in science eudcation and art programs for mainstreamed handicapped children. Described are such projects as the individual science programs and "Artists in the Schools."

Whitfield, Eddie. "Experiments on Tape," Science and Children, Vol. 13, No. 6 (March, 1976) pp. 47

The use of science experiments on tape are shown to provide for individual differences from the gifted child to the handicapped in developing skills in the language art area, developing significant concepts, and making learning come alive.

V. ACTIVITIES SOURCE BOOKS

Bell, Daniel. ESS for Children with Special Needs. New York: McGraw Hill

Describes selected ESS units that have been used successfully with mentally handicapped students.

Coble, Charles R. and others. Mainstreaming Science and Mathematics: Special Ideas and Activities for the Whole Class. Goodyear Publishing Co., Inc. 1640 S. 5th Street, Santa Monica, Calif. 90401 ($8.95)

Ideas are presented for teaching science and math to elementary classes in which handicapped children have been mainstreamed. Info. on daily objectives, teacher preparation, and student activities is provided for 36 science topics (such as investigating the structure of matter, identifying green plants, and studying the human body systems), and 36 math units (inc. learning to count, recognizing geometric shapes, studying the metric system, and handling checking acct's.)

Taylor, Frank D. and Alfred Artuso. Exploring Our Environment: Science Tasks for Exceptional Children in Special and Regular Classrooms. Love Publishing Co., 6635 E. Villanova Place, Denver Co. 80222

Intended for use with exceptional children, the teaching guide contains directions for 108 science experiences in the areas of air; electricity; heat; light; machines; magnets; minerals; seeds; sounds; and water. Tasks were selected to meet the following objectives:

promote learner interest
emphasize direction following and predictable outcomes
promote learner participation
emphasize multisensory involvement with the environment
provide opportunities for cooperative projects
strengthen academic skills

Included -

list of materials needed
illustration
directions
note about practical applications

SCIENCE FOR THE HANDICAPPED ASSOCIATION

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